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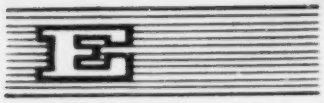

Distr. LIMITED

E/ECA/HUS/49
December 1990

ENGLISH
Original: FRENCH

UNITED NATIONS

ECONOMIC AND SOCIAL COUNCIL

UNITED NATIONS ECONOMIC COMMISSION FOR AFRICA

Sixth meeting of the Joint Intergovernmental Regional Committee on Human Settlements and Environment

Addis Ababa, Ethiopia

4 - 8 March 1991

REPORT TO THE JOINT INTERGOVERNMENTAL COMMITTEE ON HUMAN SETTLEMENTS AND ENVIRONMENT ON APPROPRIATE TECHNOLOGY FOR INTERVENTION IN THE PROVISION OF LOW-INCOME SHELTER, INFRASTRUCTURE AND SERVICES IN RURAL AREAS

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I. INTRODUCTION

1. The formulation and implementation of rural settlements development policies in Africa deal, particularly, with the development of social infrastructure such as housing and basic services, whose implementation costs depend essentially on the technology and materials used.

2. The concretization of national housing programmes initiated by member States come up against various socio-economic problems including higher housing demand arising from population increases and increasingly high implementation costs.

3. Moreover, the consumption of building materials has almost doubled in ten years, increasing from $US 40.5 million in 1975 to $US 75 million. The cost of building material imports amounts to $US 3 billion or about half the food import bill.

4. This situation has an adverse impact on the production of housing for the low-income rural population, who are generally handicapped by the unavailability of local building materials and high cost of imported products such as portland cement, corrugated iron and asbestos sheets whose selling price in most African countries make up as much as 70 per cent of the cost price of economical housing.

5. Furthermore, although the construction industry accounts for four to 11 per cent of the GDP of member States and building materials for 60 per cent of the value of the sector, the efforts made by Governments to house the majority of the people remain limited, particularly because the opportunities offered by local technologies are insufficiently developed and the natural resources available in the region are exploited only to a limited extent.

6. In this connection, numerous studies have been undertaken, particularly by ECA, underscoring the importance of a policy on the development of local materials based on the design and popularization of appropriate local technologies and on the increased supply of economical products.

7. Putting such a process into effect would promote the substitution of local production for imports, thereby leading to foreign exchange savings and investment in other equally strategic development sectors. As such, this report examines the most pertinent parameters in the development of appropriate technologies for providing low-cost housing and basic services and developing low-cost infrastructure in the rural areas.

8. The measures recommended relate mainly to the establishment of a process for increased local materials production, based on maximum integration of the small-scale enterprise sector in the

African market, standardization of equipment and products as well as the development of a promotional plan aimed at increasing awareness of and generalization in the rural areas of stabilized earth blocks, lime, tiles and burnt clay blocks and fibre cement blocks produced from such natural resources as clay, pozzolana, dolomite and other residues, mainly agricultural.

II. THE BASIS OF A LOCAL BUILDING MATERIALS POLICY

9. The potential demand and availability of mobilizable natural resources are two major factors favouring the adoption of a local building materials development policy.

1 Demand for materials

10. In the absence of precise data on building material needs in the region, observation of the general trend in the use of certain products in many countries has shown that demand is much higher than current supply.

11. Burnt earth bricks are used widely in the construction of public and private structures particularly in Ghana where annual consumption is 12.3 million units and in Nigeria where consumption increased from 41.61 million in 1982 to 74.48 million units in 1986.

12. Stabilized earth blocks are also widely used in Uganda, Madagascar, Zambia and Mali. The success of the sisal fibre concrete roofing sheets in the implementation of rural housing programmes has led to a higher demand for the product.

2. Mobilizable natural resources

13. The fact that the natural resources necessary for the production of building materials are available locally is borne out FAO research work (table 1), despite the lack of precise information on actual capacities and technical specificities of these resources.

Recommendations

14. The local production of the materials necessary for carrying out rural programmes should be integrated into a national building materials development strategy

15. Demand for local materials in the rural areas should be assessed so as to develop a production process suited to needs and to the existing capabilities that could be mobilized to implement rural housing programmes.

16. Projects for the prospection and analyses of raw material deposits in the rural areas should be developed so as to evaluate accurately their physical and chemical properties compared to the technical specificities required for their use in rural housing programmes (situation, conditions of access and exploitation, yield, purity, resistance, etc.)

17. A structure should be established at the national level for promoting and co-ordinating the activities of firms and institutions concerned with the production of local building materials meant for rural housing programmes.

Table 1: Availability of local raw materials

Country	Limestone Dolomite Gypsum Pozzolana	Sand Gravel Sandstone Other stones	Clay laterite	Agricultural, mining and industrial wastes
Burkina Faso	A	A	A	L
Burundi	M	M	A	S
Cape Verde	M	S	M	S
Cameroon	M	A	A	S
Gambia	S	M	A	M
Ghana	L	A	A	M
Côte d'Ivoire	S	A	A	M
Kenya	S	A	M	M
Lesotho	M	A	M	S
Liberia	S	A	A	M
Madagascar	A	M	A	A
Mauritania	L	M	S	S
Niger	A	A	A	S
Nigeria	S	A	A	A
Uganda	A	A	A	A
Central African Rep.	L	A	S	S
Rwanda	M	A	A	S
Sierra Leone	S	A	A	A
The United Republic of Tanzania	A	M	A	A
Togo	A	A	A	A
Zambia	M	A	A	A

Abundant (A)
Moderate (M)
Limited (L)
Scarce (S)

Source: FAO - State of the art in building materials, African region 1984.

III. TECHNOLOGIES

18. Existing technologies that could be exploited in carrying out rural housing programmes relate to the production of local materials for raising walls, manufacturing binders and constructing roofs.

1. Walls

19. Burnt clay bricks and stabilized earth blocks are among the most common and most suitable materials for wall construction in Africa.

20. Burnt clay bricks are manufactured as much in East Africa as in West Africa. Research is under way on the design of efficient kilns for increased fuel efficiency, alternative sources of energy so as to reduce the effect of tree felling on the environment and the introduction of bricks of bigger dimensions (as in the case of 290/140/100 bricks in Nigeria) in order to increase productivity.

21. Stabilized earth blocks have recently become popular because of their many advantages. Their production is not dependent on the availability of clay and is very economical on fuel. Moreover, the only equipment necessary is the manual or mechanical press, both of which can be manufactured locally.

22. However, the standardization of this product is still hampered by the question of optimal rate of stabilizing agent necessary (lime or cement) depending on the qualities of the earth used. This is a problem for which Côte d'Ivoire and Togo have adopted some recommendations and directives.

23. The physical qualities and financial implications of these materials should, however, be enhanced by developing economical protective coatings manufactured from widely available products.

2. Binders

24. Lime and pozzolana which were widely used in the past are still more economical than cement, despite their limited production due to insufficient knowledge mainly of their advantages.

25. The production of lime from calcium and dolomite makes it possible to manufacture binders, stabilizing agents and distemper for various uses.

26. The development of this material should, however, be supported by the development of efficient kilns and better-controlled baking

methods, particularly in conjunction with the use of simple measurement equipment.

27. Natural or artificial pozzolana may be used for the manufacture of pozzolanic cement, which is already relatively widespread in Ethiopia, Rwanda, Cameroon and Burundi.

28. Lime and pozzolana mixtures which are currently being researched will make for 20 percent to 40 percent savings on cement in the manufacture of medium and low quality concrete.

29. Natural pozzolana of volcanic origin is widespread in many countries including Burundi, Cameroon, Cape Verde, Ethiopia, Kenya, Madagascar, Malawi, Uganda, Rwanda, Senegal and the United Republic of Tanzania.

30. Artificial pozzolana referred to as organic pozzolana is manufactured from the controlled burning of vegetable wastes (rice, coffee and groundnut husks and sugar cane bagasse) and inorganic pozzolana from calcinated rocks, clay and bauxites.

3. Roofing materials

31. Burnt clay tiles and fibre cement sheets are two viable roofing materials in terms both of technology and finance. The cost of these materials in Malawi in 1987 were $US 2.25 and $US 1.75 per/$m^2$ respectively as against $US 8.71 for corrugated iron sheets.

32. The production of burnt clay tiles has been mastered in many countries. The material should, however, be refined through improvement of the quality of the clay used and in more finer mixing so that it can last longer than the current ten years.

33. The use of burnt clay tiles requires roof structures capable of supporting from 30 to 50 kg/m^2.

34. There has been substantial progress in the production of fibre cement tiles, particularly in East Africa during the past decade. Research on vegetable fibre mixtures (sisal, coconut), lime, pozzolana, and sand with a low cement content is providing new opportunities for the development of a still more economical product.

35. Moreover, research is also under way in Malawi on the manufacture of manual vibrating tables in order to offset the relatively high cost of battery charging.

Recommendations

36. Research into the artisanal and industrial manufacture of such high-performance equipment, as concrete mixers, incinerators, stone crushers, vibrating tables and presses should be encouraged.

37. Research into the development of alternative economical sources of energy for the production of local building materials should be promoted.

IV. PRODUCTION OF LOCAL BUILDING MATERIALS

38. The implementation of local building material development policies requires the establishment of a production process based of making the activities of both the formal and informal sectors profitable on the one hand, and assessing the capacities of various enterprises to provide high-performance and low-cost products in the rural areas, on the other.

1. Scale of production

39. The big mechanized factories particularly in the industrial areas or near the big urban centres have not been able to efficiently meet the building material needs of the rural population because they are highly expansive to acquire mainly as a result of their high import content and transport costs.

40. The production of local building materials in the informal sector has many advantages such as the ease of siting operations close to where the materials are available and the relatively low investments required, affordable by small-scale entrepreneurs as well as products cost prices often within the means of low-income groups.

41. The impact of this sector on the increased supply of efficient local materials remains limited because of the random nature and often mediocre quality of production due generally to the empirical approach to activities and poor knowledge of the needs of the market.

42. Production in the sector should, therefore, be enhanced through support actions aimed at improving the manufacturing process and adapting the rate of production to the needs of the local market.

43. Small-scale industrial production has many advantages that may well increase the supply of local building materials in the rural areas.

44. Small production plants can develop local manufacturing technologies and can be more easily established in accordance with the availability of basic products and demand.

45. Besides, the flexible management of small enterprises coupled with better control of the manufacturing process and lower transport costs make for better quality products and relatively lower cost prices.

46. Furthermore, compared to the large-scale automated plants, the production cost per worker in small plants are 20 times lower with only 15 per cent import content (as against 75 per cent in the larger plants) and has employment potential for twenty times more labour.

47. The small-scale production of local building materials therefore offers the most advantages in view of the realities of the rural building sector, namely disparate markets, low wages, employment problems, scarce foreign exchange as well as insufficient industrial equipment and infrastructure.

Recommendations

48. A network of small-scale industrial plants should be developed in the rural areas to produce building materials locally in accordance with the location of raw materials and demand so as to reduce losses during movement from place to place and travel costs.

49. Informal sector activities should be supported by research into local materials available to the sector so as to enable it to improve the quality of its production and to provide it information on local market needs so that manufacturing rates can be adapted accordingly.

2. Manufacture of the equipment necessary for production

50. The viability and autonomy of local building materials production are also dependent on the possibilities of ensuring the manufacture locally of the equipment, materials, tools and spare parts necessary for the installed technological facilities and their continuous operation.

51. This requires the accordance of priority to national-level activities by all the relevant structures such as training centres, manufacturing plants, engineering workshops, service companies and production units and contribution to the design of prototypes and manufacture of equipment in larger quantities.

52. Thus, the institution of a local building materials production process should include an evaluation of the capacities of all

sectors to locally produce the equipment required to meet their installed technological facilities and a medium- and long-term programme aimed at the development of these facilities in accordance with the objectives of rural housing programmes.

Recommendations

53. An assessment should be conducted of rural potential for the manufacture of the equipment, tools, materials and spare parts necessary for the production of local building materials and a medium- and long-term programme for the development of the identified capacities instituted.

54. Training institutions should be given the responsibility of designing prototypes of local building materials production equipment and concessionary fiscal measures taken to promote public and private investments for their production.

3. Standardization of production and institution of codes and regulations

55. Regional conferences on building materials have recommended the standardization of production and the institution of building codes for the purpose of promoting increased production, expansion of markets and better acceptance of building materials by the public and various users.

56. Research on standardization should be conducted on the basis of laboratory studies and field experiences in the implementation of rural housing programmes, so as to adapt the technical specifications to local realities.

Recommendation

57. Activities for the standardization of local building materials production should be developed and regulations drafted on the technical specifications and use of products.

4. Energy for production

58. Building materials production plants consume large amounts of energy (fuel and electricity) and firewood is the main source of energy in rural areas.

59. Production plants located in rural areas therefore face difficulties in energy supply because of poor service to their localities, the absence of energy infrastructure and the scarcity of firewood.

60. As such, the establishment of a process for the production of building materials, should constantly take account of the needs of plants located in the rural areas for energy.

Recommendations

61. Mini hydro-electric power plants should be constructed in rural areas having adequate rainfall and river networks.

62. Solar-powered technologies for the production of building materials should be developed and applied.

63. Such agricultural residues rice husks, bagasse, groundnut shells and sawdust should be used as fuel.

64. Plans should be formulated for the reforestation of affected areas with fast-growing species.

V. PROMOTION OF LOCAL BUILDING MATERIALS

65. The lack of political will for enhancing traditional techniques and the fact that research findings are not publicized, has combined with the conservative attitude of various users, to cause the stagnation, if not actual decline, of the use of local products in the implementation of public programmes, particularly self-help construction in rural areas.

66. The development of building materials, therefore, requires promotional support aimed at government services, the informal sector and the public in order to reinstitute production traditions at various levels and restore confidence in the use of such materials in the implementation of rural programmes.

67. The local building materials development process should include a promotional plan comprising a credit policy, a training and assistance programme for production enterprises, the launching of information campaigns and extension services as well as the development of research work.

1. Credit policy

68. The institution of a credit policy for the production of low-cost housing should promote access to housing credit for the low-income population, on the one hand and provide financial support for public and private enterprises engaged in the production of local building materials in the rural areas, on the other.

69. As such, the intervention of the public authorities should consist in guaranteeing the creditworthiness of individual rural builders who pose a relatively higher risk vis-a-vis the credit

institutions. They should also pressurize the financial institutions to reconsider the terms for granting loans to enterprises producing local building materials in the rural areas. In Zambia, the commercial rate charged by the Small Industries Development Organization (SIDO) is 15 per cent and the contribution of the applicants to the investment capital also about the same percentage.

Recommendations

70. Efforts should be made to promote the participation of the public and private enterprises in the establishment of local building materials production plants in the rural areas and institute flexible and concessionary procedures for obtaining credit and distributing land for the installation of such plants.

71. Efforts should be made to promote savings and support individual builders to obtain housing credit from the financial institutions for constructing family dwellings in the rural areas.

2. Establishment of training programmes

72. Many African institutions provide various levels of vocational and handicrafts training in building technology. Such programmes focus on the study and use of conventional building materials such as Portland cement and steel.

73. All these structures can potentially be adapted to meet the national training requirements in technical specifications and the use of local products.

Recommendations

74. Training structures and programmes should be adapted or established to cover all the skills necessary in the local building materials developing process, in accordance with the staff needs identified within the production units and rural enterprises.

75. Private entrepreneurs should be trained in the technology and management of local building materials production plants.

3. Institutional support to enterprises

76. Special attention should be paid to the supervision of public enterprises and informal sector firms in order to consolidate and promote their contribution to local building materials development.

77. This task which is mainly the responsibility of the public departments concerned with the promotion of local building

materials, may require appropriate structures being established to assess the production units, particularly in formulating administrative procedures, preparing applications for financing, conducting market and feasibility studies, training staff and monitoring the implementation of projects.

Recommendations

78. Efforts should be made to establish or strengthen the public structures responsible for assisting enterprises in the formal sector and those in the rural informal sector in order to ensure efficient functioning of their local building materials production and promotion activities.

4. Development of information and extension services

79. To date, the publishing of materials and advertisements has been confined to a few operations initiated by research bodies or isolated producers despite their importance to the development of local building materials.

80. The intervention of the government departments in this regard should be to promote the publication of practical manuals for the general public. It is also necessary to support and co-ordinate intensive advertisement campaigns on building materials produced locally by rural enterprises.

Recommendations

81. Efforts should be made to support the publication of practical manuals and to promote campaigns publicizing local building materials among the various users in the rural areas.

82. To generalize the use of local building materials in implementing rural programmes financed from state and local community budgets.

5. Development of research

83. The production of local materials should be bolstered on a continuing basis by research on the improvement of the performance of the products used in the past such as lime or stabilized earth blocks and the identification of new products.

84. Research activities can also cover the standardization of products and equipment and the adaptation of production to the climatic conditions in given areas.

85. The impact of research on the local building materials process could also be examined through popularization of the findings in the form of technical publications, expert and consultancy services

to small enterprises and the implementation of demonstration projects in the rural areas.

Recommendations

86. Research on the development of local building materials should be promoted and the findings applied in the implementation of rural demonstration projects and programmes.

87. A national fund for research into the development of local building materials should be established using state funds and assistance from industries, production units and enterprises.

At the regional level:

88. Subregional structures should be established to co-ordinate and develop exchange of information and experiences among research institutions in various African countries in order to avoid duplication of efforts and rationalize the use of available resources.

At the international level:

89. The sources of financing for the development of research and implementation of pilot projects in local building materials should be strengthened.

VI. INTEGRATED RURAL HOUSING POLICY

90. The formulation and implementation of strategies for economical and viable housing production in the rural areas should take account of the land question, the modalities for supplying building materials and the establishment of basic equipment and infrastructure.

1. The land question

91. Plots of land on which dwellings can be constructed are non-renewable scarce resources. As such, land generally constitutes a major constraint in the construction of family houses for the low-income groups.

92. In the production of housing for the rural population, it is therefore necessary to delimit and to constitute land reserves for implementing rural programmes, in accordance with existing regulations on land use in the area concerned.

93. The process of constituting land reserves comprise among other things, the search for and acquisition of appropriate sites, the

conduct of engineering studies and the definition of modalities for building, managing and maintaining communal infrastructure.

Recommendations

94. Land development procedures should be so formulated as to reflect national objectives on land use in the rural areas.

95. When delimiting and constituting rural land reserves for rural programmes, a close relationship between future housing estates, cultivated land and agriculture related amenities should be secured.

96. Preferential price scales should be established for rural housing and equipment programmes.

2. Promotion of rural housing

97. The launching of housing operations in rural areas aims at increased mobilization of all existing potential so as to strengthen the means of action and to consolidate the contribution of the State in carrying through rural housing programmes.

Recommendations

98. Efforts should be made to strengthen or to establish public structures responsible for prospecting appropriate sites and acquiring land for building, conducting engineering studies and developing building sites for rural housing programmes.

99. Rural housing should be promoted by granting building land for rural housing programmes involving the use of local materials on pre- ferential terms.

100. The implementation of rural housing programmes financed on state budget should be assigned to public and private enterprises on the basis of agreements and technical specifications involving the use of local building materials.

101. The formation of rural co-operatives or village associations should be promoted to carry out self-help housing and equipment programmes using local materials in particular and benefitting from technical assistance and logistical support in the supply of materials.

3. Supply of local building materials to rural areas

102. Deficient transport infrastructure and difficulty of access generally constitute a major obstacle to the implementation of housing schemes in the rural areas.

103. As such, any strategy aimed at providing economical housing should include the establishment of a supply and distribution circuit for building materials going to the rural areas, particularly to mountainous and landlocked regions.

104. Supply and distribution centres classified in a hierarchical order, namely primary, secondary and tertiary could be established in accordance with the location of work sites, building materials production plants and the centres of real or potential demand.

Recommendation

105. A supply and distribution network for local building materials should be organized for the rural areas, giving priority to landlocked or mountainous localities.

4. Establishment of housing-related amenities

106. Rural housing programmes should also include the establishment of the amenities necessary in housing estates, namely health, education, trade, services, administration and telecommunications and transport facilities.

107. The technologies identified for producing low-cost housing could also be applied in the provision of the above-mentioned amenities.

108. This will make it possible to develop the local building materials market and promote the building of such infrastructure as will raise standards in the rural areas.

109. Besides, the integration of such amenities in the design of the standard architectural and engineering plans for project sites makes for a substantial reduction in the cost price of the above services and also for savings on the time they take to implement.

Recommendation

110. The establishment of housing-related amenities using local building materials should be included in rural housing programmes on the basis of architectural and engineering studies reflecting the realities of project sites.

5. Establishment of rural networks

111. The technologies for providing basic infrastructure at low cost relate to the modalities for establishing public highway, water supply, solid and liquid waste disposal and electrification networks.

(a) Public highways

112. The construction of public highways is an essential factor in the opening up, organization and management of rural settlements. The public highways network is designed in accordance with various traffic and interconnection needs identified for pedestrians, cycles, carts, agricultural machinery, vehicles and adapted to the geo-climatic conditions of the region.

Recommendations

113. Efforts should be made to design and construct with local materials (stones, tuff, sand, etc.) a network of various grades of public highways in accordance with the road safety rules, ensuring that they are passable during the rainy season.

114 Rural highway projects should be co-ordinated with the establishment of drinking water supply, sanitation, rain water drainage and electrification networks so as to rationalize the use of available resources and prevent repetition of work.

115. Structures should be identified for the establishment and maintenance of rural highways and legislation drafted on the modalities for concluding agreements between the various partners.

(b) Drinking water supply

116. The criteria to be taken into account in the choice of technology are:

- The possibility of manufacture locally using available materials;
- The resistance of parts to wear and atmospheric conditions;
- Standardization by adapting a limited number of models so as to facilitate maintenance and training of local managers;
- Simple maintenance methods that can be easily applied by the village technicians responsible for the task;
- Production level suited to needs so as to avoid wastage of water resources.

(c) Disposal of solid and liquid wastes

117. Sanitation techniques suited to rural areas with small populations are:

- Pit latrines;
- Ventilated and improved pit latrines;
- Ventilated and improved double pit latrines;
- Odourless earth closets;
- Water closets;
- Septic tanks.

118. The shallow sewerage system is a possible technological option particularly for settlements with densities in excess of 160 inhabitants/ha. This relatively recent system holds much prospects because of the quality of service and its low price, despite the water consumption of 25 litres/inhabitant/day necessary for its operation and maintenance.

119. The establishment of rainwater disposal facilities is often neglected in rural settlements. These, however, have a major role in ensuring the viability of constructed works, in preventing floods and in the maintenance of highways and the general condition of hygiene in these areas.

Recommendations

120. Public departments should prepare development studies and carry out primary and secondary infrastructure in rural settlements, with the rural population taking responsibility for the maintenance of tertiary networks.

121. Rain water should be evacuated through a network of stabilized earth gutters along the various roads in rural settlements.

122. Each village should organize a system of collection solid wastes and disposing of them by animal or mechanical traction into a common pit managed by the authorities.

(d) Rural electrification

123. The design and establishment of the rural electrification network should be based mainly on research on economical energy sources.

124. The possible technological options for low-cost energy production in rural areas are:

- Use of solar energy;
- Biogas systems;
- Charcoal plants;
- Diesel generators;
- Hydro-electric power plants.

VII. ANNEX 1: SUMMARY OF RECOMMENDATIONS

I. THE BASIS OF A LOCAL BUILDING MATERIALS POLICY

Efforts will need to be made

125. To integrate the local production of the materials necessary for carrying out rural programmes into a national building materials development strategy.

126. To assess the demand for local materials in rural areas in order to develop a production process suited to needs and to the existing capabilities that could be mobilized to implement rural housing programmes.

127. To develop projects for the prospection and analyses of raw material deposits in the rural areas so as to evaluate accurately their physical and chemical properties compared to the technical specificities required for their use in rural housing programmes (situation, conditions of access and exploitation, yielding, purity, resistance, etc.)

128. To establish a structure to be responsible at the national level for promoting and co-ordinating the activities of firms and institutions concerned with the production of local building materials meant for rural housing programmes.

II. TECHNOLOGIES

129. To encourage research on artisanal and industrial manufacture of high-performance equipment, particularly travel plants, incinerators, finishing mills, vibrating tables and presses.

130. To promote research into the development of alternative economical sources of energy for the production of local building materials.

III. PRODUCTION OF LOCAL BUILDING MATERIALS

131. To develop a network of small-scale industrial plants in the rural areas to produce building materials locally in accordance with the location of raw materials and demand so as to reduce losses incurred during movement from place to place and travel costs.

132. To support informal sector activities by making research on local materials available to the sector to enable it to improve the quality of its production and to provide it information on local market needs so that the manufacturing rates can be adapted accordingly.

133. To assess the potential in rural areas for the manufacture of the equipment, tools, materials and spare parts necessary for the production of local building materials and institute a medium- and long-term programme for the development of the identified capacities.

134. To entrust training institutions with the responsibility of designing prototypes of local building materials production equipment and promote public and private investments for their production through concessionary fiscal measures.

135. To develop activities for the standardization of local building materials production and formulate legislation on technical specifications and use of products.

136. To construct mini hydro-electric power plants in rural areas having adequate rainfall and river networks.

137. To develop for and apply solar-powered technologies to the production of building materials.

138. To use agricultural residues such as rice husks, bagasse, groundnut shells and sawdust as fuel.

139. To formulate plans for the reforestation of affected areas with fast-growing species.

IV. PROMOTION OF LOCAL BUILDING MATERIALS

140. To promote the participation of the public and private enterprises in the establishment of local building materials

production plants in the rural areas and institute flexible and concessionary procedures for obtaining credit and distributing land for the establishment of such plants.

141. To promote savings and support individual builders to obtain housing credit from the financial institutions for constructing family dwellings in the rural areas.

142. To adapt or establish training structures and programmes covering all the skills necessary in the local building materials developing process, in accordance with the staff needs identified within the production units and rural enterprises.

143. To promote the training of private entrepreneurs in the technology and management of local building materials production plants.

144. To establish or strengthen the public structures responsible for assisting enterprises in the formal sector and those in the rural informal sector to ensure efficient functioning of their local building materials production and promotion activities.

145. To support the publication of practical manuals and promote campaigns publicizing local building materials among the various users in the rural areas.

146. To generalize the use of local building materials in implementing rural programmes financed from state and local community budgets.

147. To promote research on the development of local building materials as well as the application of the findings in the implementation of rural demonstration projects and programmes.

148. To establish a national fund for research into the development of local building materials from state budget with assistance from industries, production units and enterprises.

At the regional level:

149. To establish subregional structures responsible for co-ordinating and developing exchange of information and experiences among research institutions in various African countries in order to avoid duplication of efforts and rationalize the use of available resources.

At the international level:

150. To strengthen the sources of financing for the development of research and implementation of pilot projects in local building materials .

V. INTEGRATED RURAL HOUSING POLICY

151. To formulate development procedures in accordance with national objectives on land use in the rural areas.

152. To delimit and constitute land reserves in the rural areas for carrying out rural programmes by ensuring close relationship between future housing estates, cultivated land and agriculture related amenities.

153. To establish preferential price scales for the transfer of land meant for rural housing and equipment programmes .

154. To strengthen or to establish the public structures to be responsible for prospecting appropriate sites and acquiring land for building, conducting engineering studies and developing building sites for rural housing programmes.

155. To promote rural housing by granting building land for rural housing programmes involving the use of local materials on preferential terms.

156. To assign the implementation of rural housing programmes financed on state budget to public and private enterprises on the basis of agreements and technical specifications involving the use of local building materials.

157. To promote the formation of rural co-operatives or village associations to carry out self-help housing and equipment programmes using local materials in particular and benefitting from technical assistance and logistical support in the supply of materials.

158. To organize a supply and distribution network for local building materials meant for the rural areas, giving priority to landlocked or mountainous localities.

159. To include the establishment of housing related amenities using local building materials in rural housing programmes on the basis of architectural and engineering studies appropriate to the realities of project sites.

160. To design and construct with local materials (stones, tuff, sand, etc.) a network of various grades of public highways in accordance with the road safety rules, ensuring that they are passable during the rainy season.

161. To co-ordinate the rural highway projects with the establishment of drinking water, sanitation, rain water drainage

and electrification networks so as to rationalize the use of available resources and prevent repetition of works.

162. To identify the structure(s) responsible for the establishment of rural highways and those responsible for their maintenance and prepare legislation on the modalities for concluding agreements between the various partners.

163. Public departments should prepare development studies and carry out primary and secondary infrastructure in rural settlements, with the rural population taking responsibility for the maintenance of tertiary networks.

164. To evacuate rain water through a network of stabilized earth gutters along the various roads in rural settlements.

165. To organize a system of solid waste collection at each village and to dispose of them by animal or mechanical traction to a common pit managed by the authorities.

ANNEX

Table 1: Field of activity of research institutions.

Table 2: Suitability of laboratory equipment for building materials research.

Table 3: Major accomplishments of research institutions.

Table 4: Training programmes of research institutions.

Source: UNECA - Review of capacities of research and development institutions in Africa - March 1988.

1. FIELD OF ACTIVITY

Institution (country)	Adobe Stablized earth	Lime	Pozzolana Nat./Art.	Rice Husk ash	Burnt brick	Clay tile	Fibre-cement sheet/tile	Lime-Pozzolana (cement)
ETHIOPIA Materials Research and Services Department (MRSD)	X							
GHANA Building & Road Research Institute (BRRI)	X	X	X	X	X	X		
KENYA Housing Research & Development Unit (HRDU)	X						X (Also Kenyata University College)	
MADAGASCAR Laboratoire National des Travaux Publics et du Bâtiments (LNTPB)	X	X	X	X	X		X	
NIGERIA Nigerian Building & Road Research Institute (NBRRI)	X	X		X		X	X	X
RWANDA Laboratoire de Génie Civil (LGC)		NO	INFORMATION					
SENEGAL Centre Expérimental de recherches et d'études pour l'équipement (CEREEQ).	X	X	X	X	X			X
TANZANIA National Housing and Building Research Unit (CERREU)	X	X	X		X		X	X
TOGO Centre sous-régional de recherche sur les matériaux de construction et le bâtiment (CERREM)	X	X		X	X			

2. SUITABILITY OF LABORATORY EQUIPMENT FOR BUILDING MATERIALS RESEARCH

Research Institution	Stabilished Earth	Lime	Pozzolana	Rice husk	Brick	Fibre Cement sheet
ETHIOPIA (MRSD)	A	-	-	-	-	-
GHANA (BRRI)	A	A	B	B	A	-
KENYA (1) (HRDU)			(See the footnote)			
MADAGASCAR (LNTPB)	A	A	A	A	A	B
NIGERIA (NBRRI)	A	A	A	A	B	B
RWANDA (IGC)	B	B	B	-	B	-
SENEGAL (CERERQ)	A	A	A	A	B	-
TANZANIA (NHBRU)	A	A	A	A	A	A
TOGO (CERER)	A	A	B	B	B	-

Note : "A" means equipment is suitable for major research
"B" means equipment is suitable for minor research and testing

(1) HRDU shares laboratory facilities with the Faculty of Engineering at the University of Nairobi. The existing laboratories are equipped to carry out research and testing work on building materials including soil, cement and concrete, clay products and ceramics.

3. MAJOR ACCOMPLISHMENTS OF RESEARCH INSTITUTIONS

Country/ Institution	Major Achievements	Application of Research Findings (pilot plants, etc.)
ETHIOPIA HRSD(MUDH)	Development of building blocks from pumice, lime and gypsum.	Prototype houses built with compressed earth bricks, PKG blockets and hollow concrete blocks on black cotton soil.
GHANA (BPRI)	Design of brick and lime kilns. Comprehensive evaluation of lateritic soils and pozzolanic materials	Setting up of pilot plants. Two brick pilot plants were later handed over to entrepreneurs. Construction of prototype houses in brick and timber. Consutancy and training.
KENYA (HRDU)	-	Transfer of research findings on appropriate building materials and technologies to rural communities to improve their built environment. Construction of demonstration buildings in local materials.
MADAGASCAR (LNTPB)	Evaluation of limestone deposits. Lime stabilization for road construction.	Assistance to production units for fibre-cement tiles, lime, cement, bricks(quality control).
NIGERIA (NBRRI)	Design and fabrication of block making machine. Design and construction of vertical shaft kiln for lime production of table for manual production of roofing sheet from coir.	Used block machine to produce cement stabilised blocks for construction of prototype house. Pilot project on model village using local materials.
RWANDA (LGC)	-	-

Country/ Institution	Major Achievements	Application of Research Findings (pil plants, etc.)
SENEGAL (CRREEQ)	Exposure test results on stabilised soil walls covering period of over 30 years which have proved their long-term durability.	Popularization of stabilised soil block constructions.
TANZANIA (NHBRU)	Improvement of lime kiln. Introduction of brick making technology, improvement of field clamps. Introduction of fibre reinforced cement sheet technology. Introduction of pozzolime and pozzocement in Tanzania. Participated in design of improved block press.	Field demonstration of materials production and utilization technology. Large-scale production plant for sisal fibre reinforced cement sheets has been established. Distribution of publications, some in local languages. Consultancy and training.
TOGO (CERSIA)	Design and construction of kilns for producing lime and burnt bricks.	Established production units for lime and burnt bricks. Technology for lime production has been transferred to a local entrepreneur. Stabilised soil technology has been promoted through its use in construction of houses and other buildings. Consultancy and training.

4. TRAINING PROGRAMMES OF RESEARCH INSTITUTIONS

Country/ Institution	Type of training offered
ETHIOPIA HRSD(MUDH)	-
GHANA (BRRI)	6 weeks brick technology course for technicians (A). Training courses in lime production (B). Courses in building construction management (C).Materials testing and standardization (C).
KENYA (HRDU)	The unit provides service teaching to the Departments of Architecture, Land Development, Urban and Regional Planning in the University of Nairobi (A). Training of rural communities in the production and utilization of local building materials (A).
MADAGASCAR (LNTPB)	Stabilised soil technology (C). Burnt bricks (C).
NIGERIA (NBRRI)	Train the trainers programme on use of local materials such as bricks, coir fibre corrugated roofing sheet as part of programme drawn up by the Directorate of Food, Roads, and Rural Intrastructures, 3 weeks per course for the 19 States of Nigeria (A).
RWANDA (LGC)	The laboratory provides technical support for the training of graduate civil engineers (A).
SENEGAL (CERERQ)	Courses planned in stabilised soil technology and materials testing (B), courses on lime, plaster and pozzolana could be offered if there is a demand (C).

Country/ Institution	Type of training offered
TANZANIA (NHBRU)	Local building materials production (A). Materials testing (A). Building technology (A). Building design (B). Building regulations (C)
TOGO (CERFM)	Courses for masons (A), Carpenters (A), health inspections (A), draughtsmen (A), engineers (C), architects (C), students (C).

Note: "A" means "on-going"
"B" means "planned"
"C" means "possible if demanded"

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NYPL

UNITED NATIONS
ECONOMIC AND SOCIAL COUNCIL

Distr. LIMITED

E/ECA/HUS/50
November 1990

ENGLISH
Original: FRENCH

UNITED NATIONS ECONOMIC COMMISSION FOR AFRICA

Sixth meeting of the Joint
Intergovernmental Regional
Committee on Human Settlements
and Environment

Addis Ababa, Ethiopia, 4-8 March 1991

REPORT TO THE JOINT INTERGOVERNMENTAL REGIONAL COMMITTEE ON HUMAN SETTLEMENTS AND ENVIRONMENT ON SELECTED MEASURES CONDUCIVE TO ACCELERATED SUSTAINABLE RURAL TRANSFORMATION IN THE AFRICAN REGION

I. INTRODUCTION

The origin and evolution of rural development in Africa

1. The question of rural development in Africa was very quickly perceived as being complex, and reflection on the matter focused on the definition of the concept and its objectives as well as the most effective organizational means for attaining those objectives.

2. The initial endeavours to this end marked the beginning of rural development in Africa and particularly made clear to contemporary generations the actual nature of the links between the rural areas and cities.

3. In fact, it became obvious that the process of urban modernization and the establishment of the infrastructure needed for colonial exploitation had plunged the rural areas into a deterioration that had deprived rural communities in Africa of their original vitality and promoted the steady decline of the traditional rural civilization.

4. This frightening reality was accompanied among African politicians, management and experts by a wave of ideas and intentions that led to a massive movement of solidarity against the despotism that had reigned in the rural areas up to then and promoted a new approach to the rural question, aimed at identifying the role and demands of the rural communities in economic and social development in Africa.

5. The definition adopted in this regard of the concept of rural development and the objectives laid down for its attainment underscore the level of change expected, namely the achievement of a positive evolution of the lifestyle and production of the rural people and an improvement of their living conditions through a series of qualitative and quantitative transformations.

6. To lay down the theoretical basis for this concept, a series of meetings, both regional and international, were organized during the early years. Among these, the Regional Conference on a Rural Development Policy in Africa, held in Moshi in 1969 remains the watershed in the history of rural development in Africa.

7. This conference was preceded in 1966 by the Conference on Education, Employment and Rural Development organized in Kerisho and many other expert meetings held in Accra, Libreville and Kenya.

8. Moreover, pursuant to resolutions of the United Nations General Assembly (Resolution 1674 of 1961) and the Economic and Social Council (Resolution 903 of 1962) ECA organized an expert meeting in 1963 and sent an evaluation mission to Ghana in the same

year and a second mission to Cameroon in 1966, thus enabling joint study and harmonization of the viewpoints of member States and institutions.

9. It should be mentioned in this connection that the meeting organized by ECA in 1968 of the FAO/ILO/UNESCO/UNICEF/WFP Inter-Agency Committee served as a basis for the preparation of the IBRD document "Guidelines and Strategy for concerted rural development in Africa".

10. The changing perspectives in the outlook on the rural areas was accompanied by the emergence at the level of formulation of specific terminology such as community development, rural leadership programmes, and integrated rural development and at the level of implementation by the planning and implementation of specific national projects.

11. This new phenomenon led to a general consensus on rural development as the only alternative to people-centred and lasting development.

12. However, while the principle of integrated rural development is today a reality in Africa, the fact remains that the strategy to be implemented, in general, and measures likely to accelerate rural transformation are still highly relevant.

Destruction of rural areas in Africa

13. The history of rural Africa has been marked by a spontaneous integration of human settlements into their ecological space and more recently by the disintegration brought about by colonial aggression and aggravated by unfavourable geo-climatical conditions.

14. The formation and dynamics of rural settlements in the major geographic regions of Africa demonstrate a resourcefulness and ability to adapt to geo-morphological conditions, particularly in the choice of location, with the mode of land use always being dictated by the search for security and optimum food production.

15. The agro-pastoral civilization of the Sudano-Sahelian region and the tradition of trading along the major Rivers Niger and Senegal have promoted the formation at the regional and consequently at the village level of densely populated areas with crowded settlements located on defendable sites selected in accordance with the extent of cultivated agricultural lands, the size of livestock and available grazing land.

16. The climatic conditions in the Sudan region with the peculiar irregular rainfall and poor soils are the cause of the formation of scattered settlements.

17. In the forest areas of Africa, the concern of each ethnic group to control land and the creation of rest zones for shrubs around community land have served as veritable land use strategies; food crop plantations were cultivated around the tracks linking the various hamlets arranged in a linear fashion.

18. The history of rural Africa also shows that this situation of equilibrium has been disrupted by factors relating to political, economic and geographic changes.

19. The introduction of administrative reforms, the cash crop economy and the establishment of the infrastructure necessary for colonial exploitation, particularly in rural areas or in major towns, has brought about the dismantling of traditional structures. Even the relatively less-affected peripheral areas have suffered the consequences of the re-organization of services and the establishment of control infrastructure.

20. After acceding to independence, African political authorities still did not draw on their national socio-cultural and economic values, but rather modified the political environment, sometimes promoting confrontation and antagonism between the rural sector and the urban sector.

21. At the regional level, the new dynamics of rural settlements has been characterized by an increasing attraction for communication routes and urban life, with villages repeatedly changing locations in a linear fashion along access roads, thus destroying the structure of village communities, promoting massive rural exodus and the breaking up of families.

22. This situation, has combined with the effects of climatic conditions promoting drought, desertification, scarcity of fuelwood and declining food production to reduce the "green African countryside" to a "no man's land" that is difficult to live in, unproductive and unsafe.

Current situation in the rural areas

23. The situation at present is one in which development activities are concentrated in the urban areas or in less than 10 per cent of the territory of African countries and the fruits of development unequally distributed to the detriment of the rural people who account for more than 60 per cent of the total population.

24. Moreover, the transfer and exploitation of raw materials, particularly for the industrial and infrastructural development of urban areas has led to serious regional disparities characterized by steady depopulation and impoverishment of the rural areas.

25. Forced by poverty and lack of land to flee the rural areas or attracted by the mirage of a new life to be gained from salaried employment, participation in the monetary economy and satisfaction of Western-style needs, large numbers of peasants have been flocking to the cities and to the mining administrative and/or industrial centres, for about half a century now.

26. Thus, rural exodus in particular has reversed trends in population distribution in Africa and stimulated urban growth since the beginning of the century. During this period, the population of the five largest cities in Africa has increased three and half times or, even in some cases, fivefold.

27. However, the impact of urbanization in most of the African countries cannot be uniform, since the population pressure varies from country to country depending on levels of population, urban organization and land use.

28. It is obvious all the same that negative transformation of the rural areas is the lot of the majority of African countries. This is characterized by:

(a) Attraction of the active population away from the rural areas and a decline in agricultural production;

(b) A yawning gap between living conditions in urban areas and rural areas.

29. Consideration of the health situation and availability of basic infrastructure and services show that the rural areas are poorly equipped. The prevalence of waterborne diseases is a matter of very serious concern because of their mortality and morbidity effects, which are among the primary causes of disease and of the decline in production.

30. Moreover, while in education considerable progress has been made in the conditions of schooling of rural youth, problems particularly overcrowding in the schools need to be substantially addressed.

31. Drinking water supply to rural people is an area where urgent action is needed. This is because Africa has the least drinking water facilities in the world, with a rate of water consumption of only 15 to 35 litres per day per capita as compared to 70 to 90 litres per day per capita for South-east Asia.

32. Only 30 per cent of the rural population in Africa have drinking water as against 60 per cent in urban areas with only 40 per of the total population having drinking water supply as against the international figure of 52 per cent.

33. Drinking water supply has to date gone mostly to the urban areas, where according to a study undertaken in 1983, 50 per cent of the population in 30 out of 41 countries had drinking water. According to the same study, only five countries out of 41 had managed to provide the same level of services for the rural population.

34. The results expected from the establishment of manual hydraulic pumps because of the their cost and easy functioning had been limited because of various problems including lack of spare parts, proliferation of patents as well as manufacturing faults and maintenance difficulties.

35. The situation regarding solid waste disposal and sanitation installations in general is worse. Only 18 per cent of the rural population (as against 55 per cent in urban areas) have such facilities.

36. Human and financial investments in the establishment of the communication and transport routes for opening up isolated or land-locked regions as well as rural areas in general remain inadequate in spite of the programmes carried out or under way in countries such as Kenya, Ghana, the Niger and Zambia.

37. It is in the context of this extremely worrying situation that the recent United Nations Programme of Action for Africa's Economic Recovery and Development identified the establishment of rural infrastructure as one of the support sectors for agriculture and rural development and recommended intensifying the establishment of such infrastructure.

Government policies and rural development experiences

38. The reaction of Africans to the steady deterioration of the rural areas has been generally characterized by the lack of a clear philosophy on both the kind of social structure to develop and the ways and means of building such a structure.

39. However, some of the efforts made by the States in implementing their development plans as instruments of economic and social promotion, have led to the definition of doctrines and actions that have proved worthwhile.

40. The socialist philosophy of Tanzania perceived the transformation of the rural society as an essential aspect of national progress. The Ujamaa or villagization concept was developed as a form of socio-economic organization and a "synthesis of traditional cultural values". This definition served as the basis for the preparation of the economic and social development plan of the country from 1969 to 1974.

41. Other approaches have also been tried, among them the agricultural co-operatives in Senegal the production units in Tunisia and the Niger, self-management in Nigeria and the agrarian and women's co-operatives in other countries.

42. Other experiences with liberal undertones have also been carried out in countries such as Morocco and Kenya. These have been based on increased private sector investment and aimed at the institution of agrarian capitalism that would bring about advancement through generalization of its effects among rural people.

43. Similar to these various ideological approaches, rural policies initiated in African countries have also promoted the creation of administrative and/or technical structures responsible for initiating activities that are increasingly rural-oriented.

44. These activities have consisted, for the most part, either in delimiting zones in the rural areas for organizing community services or in developing new zones, especially within the framework of development or equipment programmes, in conjunction with the regrouping and/or transfer of the people.

45. In the countries concerned, such operations have been carried out by specialized bodies or such societies as the Société des terres neuves in Senegal, the Office du Niger in Mali and the Autorité pour l'aménagement de la region du Sud-Ouest in Cote d'Ivoire.

46. The implementation of such operations has often been preceded by feasibility studies on geo-hydrological, demographic, pedological factors, etc. with a view to designing a master plan for the organization of the collective infrastructure development works to be followed by the construction of the settlement.

47. Moreover, the operations often comprised the organization of various forms of assistance for the people until the first harvest.

48. The difficulties observed in the execution of these operations have related mainly to the choice of rest zones and the ability to integrate migrant population in their new resettlement areas in terms of the socio-economic habits of the families concerned.

49. Nevertheless, in spite of the poor results obtained, it is obvious that efforts made in carrying out these operations have made it possible, for some decades now, to experiment with sectoral studies and to accumulate a substantial amount of information which serves as the background and basis for new approaches to the challenges and issues posed by the situation of the rural people.

Challenges and issues at stake

50. The main challenge is that posed by the urban areas. Studies of the World Conference on Development and Environment define the challenge that the developing countries should meet in order to promote their rural areas and to stem the tide of rural exodus, in addition to solving a fundamental urban crisis in which 40 per cent of the population would be concentrated in small agglomerations, cities or mega-cities by the end of the century.

51. The report of the Commission notes in this regard that in the same way that the destiny of an urban area depends on the role that it plays in the domestic or international urban fabric, that of the rural area depends on its agriculture, forest, mining industries, etc. on which the urban areas depend.

52. The extent of urbanization during recent decades in the major development poles in Africa has led to a doubling of the rural population within a span of 60 years, while the urban population has increased tenfold during the same period.

53. The population of sub-Saharan African cities such as Nairobi, Nouakchott, Lusaka, Lagos and Kinshasa increased sevenfold in only 30 years from 1950 to 1980.

54. Such a rate of urban growth was made possible particularly by net immigration arising from rural exodus. Should this continue up to the year 2000, Third World cities will have over three-quarters of a billion inhabitants, making it imperative for the States and urban institutions to expand their social infrastructure establishment and management capacity by 65 per cent, at a time of unfavourable economic situation characterized by reduction of resources and increasing demand.

55. Another challenge is that posed by the various aspects of environmental protection, particularly preservation of the eco-system and control of the desertification that is currently affecting nearly 85 per cent of the people.

56. Lastly, there is also a technological challenge in the sense that to increase productivity in the various branches of economic activity, advanced technology should be adopted and adapted and traditional technologies developed.

57. The challenges posed by the stagnation or deterioration of the living conditions of rural people have been described in an ECA study entitled: Beyond recovery: ECA-revised perspectives, 1988-2008.

58. The question of population and the repercussions of urban population growth (3.1 per cent as against 2 per cent in the developed countries) will worsen the regional disparities as far as employment, food requirements and state of social infrastructure are concerned, and trigger social strife and political and economic instability in the coming decades.

Conclusion

59. The issue of development for improving rural living conditions, raised nearly 30 years ago, has gradually become one of the priority issues in the discussions of regional institutions. The evaluation of the United Nations Programme of Action for Africa's Economic Recovery and Development presented to the 14th Meeting of the ECA Conference of Ministers in April 1988 revealed that African Governments had been promoting the development of their rural areas.

60. These initial achievements in rural promotion have been attained on the basis of a realistic assessment of the challenges that have undermined widespread mobilization the States.

61. Many programmes had thus been launched in an attitude of expectation although with no less strong conviction. These have been accompanied by concrete action through which all the various experiences had been drawn on in an effort to find the most efficient means of attaining quick and low-cost solutions.

62. It should be mentioned in this regard that although the situation is still critical, in terms of the precarious living conditions in rural areas, African States are today united and determined in their search for the tools and measures likely to stimulate and accelerate rural development in the region.

63. It is precisely in such a situation that the following measures can bring about success and maximum impact.

II. PRIORITY ACTIONS

64. The formulation and implementation of a land development policy should seek to bring about regional balance through economic and territorial planning of the appropriate investments. This should focus on the decentralization of decision-making and management of development projects on the basis of multi-sectoral programmes aimed at the development of the economic potential of rural areas and raising of the level of infrastructure in rural settlements.

65. The best way of achieving this is to reduce urban growth in the major economic poles and to develop rural agglomerations through locating activities and infrastructure in land-locked or backward regions.

66. The initiation or finalization of the division of countries into manageable administrative units should be based on evaluation of the economic potential and existing infrastructural situation so as to promote complementarity between the various territorial units, on the one hand, and autonomous creation of resources, on the other.

67. The establishment or strengthening of decentralized management structures such as local communities, village associations and community organizations should be a major objective in the rural development process.

68. Locating technical services in the territorial units will make it possible to develop advisory-assistance for the aforementioned management structures and promote the identification of rural programmes suited to local conditions and based on comparative evaluation of projects and feasibility and impact studies.

69. Launching an aerial coverage operation over the entire territory or over priority zones is a necessary basis for implementing rural settlement development programmes dealing either with the restructuring of existing centres with the development of infrastructure or the establishment of new agglomerations from existing clusters of settlements or new sites.

70. In this connection, the study of development plans at the local level should aim at organizing rural amenities around activity centres having transport and communication links and facilities for agricultural production, storage and marketing.

71. Strengthening of the economic and technological base is a vital in the process of transforming rural conditions. This entails mostly the establishment of an apparatus for the production of goods and services, for increasing agricultural production and for creating employment through priority investments in the private sector, agro-industry processing and in building materials.

72. Recommendations on the primary sector

(a) The potential of traditional agriculture should be developed simultaneously with investments in the modern agricultural sector;

(b) The use of arable land should be restructured and plots of land given to as many workers as possible on individual or collective basis. The land should be divided up in accordance with

the pedological characteristics, expected sepecutation and the human and material resources allocated for their exploitation;

(c) New lands should be developed for expanding agricultural production within the framework of planned operations, governed by regulation. Such operations will cover priority areas identified on the basis of guidelines of rural development plans. They could also serve as the mobilization and organizational framework for the inactive population in general and the youth in particular;

(d) Plots of land meant for food crop production within the periphery of urban and rural establishments as well as those adjoining family dwellings and which form part of the public domain should be protected. The mobilization of such plots for urbanization purposes and the modalities for their transfer between public or private agents should be subject to specific regulations and legal provisions. State departments and local communities will be responsible for ensuring strict application of these regulations.

(e) The activities of young farmers and agricultural associations should be supported through:

(i) Establishment of credit schemes for promoting agriculture;

(ii) Provision of equipment and selected seeds;

(iii) Popularization of appropriate technologies that do not require costly capital equipment;

(iv) Organizarion of a storage and marketing circuit;

(v) Establishment of local instiurions responsible for defending the interest of farmers and motivating them to produce more.

(f) Conscruction of small water supply schemes and reservoirs together with the implementation of a desertification control and plant cover protection programme.

73. Measures for promoting industrial activities:

(a) Industries for processing, packaging and conservation of agricultural produce locally should be established in the rural areas in view of their immediate multiplier effects;

(b) Support should be given to the formulation and organization of economic interest groups that will establish processing units;

(c) Concessional fiscal measures should be instituted for productive investment in goods and services in rural areas;

(d) Small scale private entrepreneurs operating in rural areas should be informed and educated on the methods of preparing, programming and managing economic projects;

(e) Small- and medium-scale enterprises should be specialized in sub-contracting from the large production units located in the industrial or urban centres.

74. The promotion of local building material manufacturing plants requires relatively smaller investments because of the low energy consuming technologies involved and the use of locally available raw materials. Such installations are, however, labour intensive and can contribute to employment creation and the development of social infrastructure.

75. Actions required to this end are:

(a) Promotion of the training of private entrepreneurs in the technology and management of local building materials production plants;

(b) Institution of credit schemes for acquisition of the land and equipment necessary for carrying out rural projects;

(c) Generalization of the use of local materials in implementing rural construction programmes.

Development of appropriate rural technology

76. The appeal launched in the Lagos Plan of Action by ECA for member States to devote one per cent of their GDP to the development of more effective production methods and improvement of traditional technologies has remained a dead letter up to now whereas current development trends and prospects of the African economy make technological development an imperative.

77. One promising sector in which adequate investments have not been made up to now is the development and popularization of appropriate technologies for rural areas.

78. Yet research work on technology transfer to the rural areas has identified a number of potential areas including:

(a) Post-harvest technologies for preserving and marketing agricultural produce;

(b) Water, sanitation and irrigation systems;

(c) Exploitation of renewable sources of energy;

(d) The biogas system for domestic lighting, refrigeration and fish preservation;

(e) Solar energy for heating and cooking;

(f) The use of vegetable waste in fire fighting, roofing and for manufacturing cheap cooking utensils;

(g) Increasing the use of local building materials in low-cost housing projects.

79. Recommendations are:

(a) The use of new technologies should be promoted and traditional technologies improved, particularly those relating to renewable energy resources and local materials;

(b) The capacity of rural research institutions should be strengthened and their finding applied more widely to specific projects;

(c) Investments for the procurement of equipment and new technologies should be matched to rural infrastructure and the technological level of local users.

Strengthening the financing capacity of rural programmes

80. Financing determines the possibility of carrying out rural development programmes. As such measures should be instituted to increase financial resources and structures and decentralized procedures established for implementation locally of the said programmes.

81. Action needed to this end are:

(a) To allocate more resources to the implementation of rural development programmes within the framework of a more balanced distribution of GDP between the urban economy and rural infrastructural requirements;

(b) To establish a national fund for financing rural development programmes and diversify the sources of financing for replenishing the fund (State budget, social security and other forms of insurance, local communities, enterprises, development companies, economic interest groups, private savings, etc.);

(c) To promote investment in rural areas through concessional fiscal measures;

(d) To promote rural savings and access to credit for implementing rural development projects and programmes;

(e) To decentralize decision-making on public investments for financing rural programmes at the level of local communities;

(f) To introduce autonomy in the functioning and management of organizations operating in rural areas by enacting appropriate legislation.

Rural employment policy

82. Rural exodus involves young unemployed or underemployed youth migrating from the rural areas to urban agglomerations. In 1984 out of 102.2 million youth aged between 14 and 25 years, 64 per cent lived in the rural areas, looking for some form of training or paid employment or as heads of family.

83. This situation has led many African countries in recent years to develop special programmes for the youth, involving mainly literacy courses and the acquisition of basic technical skills.

84. Looking at the results of these programmes, it is evident that there is the need to go beyond the current approach and to integrate youth programmes into local and national development programmes and plans for employment creation.

85. Recommendations in this regard are:

(a) The current situation and future trends in employment demand should be assessed through specific studies, surveys and opinion polls;

(b) A national register of local on-going or planned projects should be established, identifying the technical specifications and the intake capacity of each project;

(c) Transitional structures between the period of training rural youth and the time they are engaged in employment should be increased and improved so as to promote quick adaptation and acquisition of know how;

(d) Non-agricultural employment should be created on the basis of existing structures, resources and supervisory facilities, particularly within the context of a rural industrialization policy based on small- and medium-scale enterprises;

(e) Support structures should be established and credit schemes adapted to provide trained rural youth with the basic equipment they require for exercising their trades (regional

guarantee funds for granting loans to the youth, group credit, supervised credit, etc.);

(f) The implementation of economic projects and those for the development of entrepreneurship among rural youth should be promoted through information dissemination and training in management and marketing techniques.

Development of social structure

86. The transformation of conditions in the rural areas is contingent upon the just distribution of the fruits of national development through improved levels of equipment and the development of social infrastructure, particularly housing.

87. The establishment of basic infrastructure and services in the rural areas is generally a welcome subject among the various development planning structures, and the impact of such installations on the improvement of living conditions in rural areas is well known.

88. However, the cumulative achievements in the region in this regard are often dependent on priorities accorded to such installations in development plans, particularly in terms of resource allocations and facilities, more or less similar to what pertains in regard to rural development objectives.

89. The social infrastructure programme aimed at rural transformation should comprise the establishment of water supply, liquid waste disposal, health, education, housing, electrification and road transport systems.

Drinking water

90. The establishment of a drinking water network and/or the inter-connection of sources of supply is one of the fundamental elements in improving health conditions.

91. This objective should, however, be integrated right at the outset into a global approach to the establishment of human settlements that encompasses issues relating to:

(a) The availability, evaluation and modalities for the supply or transfer of water resources;

(b) Assessment of actual needs and demand trends;

(c) Optimal distribution of resources between domestic consumption needs and those for other activities;

(d) Identification of resource conservation and management measures.

92. The drinking water supply programme should focus on:

(a) Coverage of the priority zones defined in the hierarchy of rural centres based on population and in relation to the perspectives of the rural development plan;

(b) Identification of the technological process in accordance with available financial resources and facilities.

93. The criteria to be taken into account in choosing technology are:

(a) The possibility of local production and use of available materials;

(b) The resistance of parts to wear and atmospheric conditions;

(c) Standardization by adapting a limited number of models so as to facilitate maintenance and training of local managers;

(d) Simple maintenance procedures that can be easily applied by the village technicians responsible for the task;

(e) Relatively low purchase price;

(f) Production levels suited to needs so as to avoid wastage of water resources.

Sanitation

94. Whereas sanitary facilities for the disposal of liquid and solid wastes are vital in rural settlements, the availability of such facilities in Africa is very limited, with 18 countries having less than 10 per cent coverage and only 5 countries having a coverage of 50 per cent or slightly more.

95. The sanitation techniques suitable for sparsely-populated rural areas are:

(a) Pit latrines;

(b) Ventilated and improved pit latrines;

(c) Ventilated and improved double pit latrines;

(d) Odourless latrines;

(e) Water closets;

(f) Septic tanks.

96. The shallow sewerage system is another possible technological option particularly for areas with population densities of over 150 inhabitants /ha. Nevertheless, this relatively new system holds much prospects because of the quality of service and low cost, despite the consumption rate of 35 litres/inhabitant/day necessary for its function and maintenance.

97. The establishment of rain water evacuation and solid waste disposal facilities are often neglected in rural settlements. However, they have a major role to play in ensuring the stability of structures, flood prevention, maintenance of roads and the general conditions of hygiene.

98. Recommendations in this regard are as follows:

(a) The public services should conduct development studies and establish basic infrastructure in rural settlements, leaving the responsibility for the management and maintenance of equipment and secondary and tertiary infrastructure to the rural population;

(b) Rain water should be evacuated by means of a network of stabilized earth gutters along the various roads and in accordance with topographical conditions;

(c) A solid waste collection system should be organized at each rural centre and wastes evacuated by animal or mechanical traction to a common dumping site.

Health facilities

99. The measures aimed at improving the health situation in rural areas should be conceived within the context of a comprehensive approach, integrating the problem of infrastructure with those related to food balance, occupational medicine, education, etc.

100. Recommendations in this regard are:

(a) A medium- and long-term policy should be formulated and actively implemented;

(b) Vaccination, preventive, mother and child care campaigns and health inspection services should be increased;

(c) Birth spacing and family planning programmes should be gradually introduced in view of their relationship to the raising of the living standards of family units;

(d) Mobile teams should be sent periodically to conduct vaccination and health care programmes;

(e) Rural health workers should be trained and permanent facilities built to provide emergency care and first aid, taking into account the areas to be covered and conditions of access to these areas;

(f) Rural areas should be provided with a network of health infrastructure comprising facilities capable of providing various levels of health care, in accordance with the hierarchy of rural centres and within the context of the rural development plan for the region concerned (dispensary, health centre, maternity, poly-clinic, hospital etc.)

101. Education and vocational training are the most effective ways of bringing about long-term transformation and integration of villagers in the national economic and social development process.

102. Action needed in this regarded are:

(a) To establish bigger schools and reduce the number of pupils per class;

(b) To build schools and training institutions nearer housing estates;

(c) To establish vocational training programmes in relation to on-going activities in the area concerned, particularly for dropout youth aged from 8 to 14 years;

(D) To organize literacy and continuing education courses for adults.

103. Road transport is a vital factor in strengthening rural settlements, particularly in opening up remote areas and providing communication links with production zones, local markets and other facilities or services.

Recommendations

104. A road transport plan should be prepared together with the rural development plan and should be based on:

(a) An assessment of current levels of traffic and infrastructure;

(b) Prospects for the development of traffic in the area concerned;

in projects to be implemented.

(i) Clear identification of the structures responsible for carrying out works, on the one hand, and those responsible for maintenance, on the other, by enacting legislation and instituting modalities for concluding agreements between the various partners.

105. Rural electrification often seems an unattainable objective when the actual possibilities of States are considered. However, it is absolutely vital that any policy for the transformation of rural conditions include the provision of electricity.

106. The formulation and implementation of a rural electrification plan should be based on research into the economical sources of energy and reflect natural resources potential, existing infrastructure and popularization of research findings on renewable energy.

107. The possible technological options for the production of low - cost energy are:

(a) Solar energy;

(b) Biogas systems;

(c) Diesel generators;

(d) Charcoal plants;

(e) Hydroelectric power plants.

108. The promotion of housing as part of the land and territorial balance policy promotes the return of rural people to rural areas to settle and also reduces the population densities in the big urban centres.

109. Recommendations

(a) Housing promotion activities should be embarked upon within the framework of the restructuring of existing rural centres or the establishment of new settlements in accordance with the orientations of the development plans for the area concerned;

(b) Development procedures in keeping with national land use objectives should be formulated, taking into account the problems of land diversion and speculation;

(c) Government agents responsible for land acquisition, engineering studies, servicing and transfer of plots for family needs and various activities should be mobilized;

(d) Preferential rates should be established for land acquisition and transfer for families and for rural investments;

(e) A system should be organized for the supply and transportation of building materials to rural areas, particularly to landlocked and mountainous regions.

110. It emerges from the foregoing recommendations that the implementation of social infrastructure programmes should be based on the following criteria:

111. The existence of preliminary studies integrating the orientations of a rural development plan and taking account of:

(a) The identification of settlement sites away from floods and strong winds;

(b) Availability of energy and water resources as well as proximity to production centres;

(c) Designation of areas for the disposal of solid and liquid wastes;

(d) Definition of priorities in the implementation of various equipment programmes, indicating phases to be carried out in the short, medium and long terms.

112. Implementation studies and technical specifications should address the urgent need for low-cost construction, particularly through the maximum use of available materials, the use of local manpower and the possibility of easy maintenance.

113. There should be a possibility of stage-by-stage improvement, substituting one technology for another as more financing becomes available, without management being seriously affected.

114. Participation of local communities and people and the establishment of a management structure make it possible to reduce the cost price of infrastructure by substantial proportions, such as the 30 per cent reduction in the Tanzanian AEP project.

115. The question of standards, in terms of the level of facilities per capita, is a relative concept that needs to be appraised on the basis of the technical and economic conditions in each country and the possibility for improvement within a given period.

116. It is obvious that modest objectives should be set at the initial stages and made more and more ambitious over time, in accordance with prevailing socio-economic conditions.

117. As such, the search for a more equitable distribution of incomes, modern amenities and social advancement facilities among the urban population and the rural masses can now be the first "standard target" that can be pursued by each State.

118. Once this stage has been attained, it can then justifiably constitute a platform for the definition of other objectives such as the application of the standards laid down by international organizations for various sectors such as health, education and housing.

III. COMPLEMENTARY MEASURES

119. These are aimed at the achievement of a conducive environment for implementing activities initiated by the public sector, through training and gradually making locally elected officials aware of their responsibility for greater autonomy in the day-to-day management of rural centres and the generation of resources.

120. Recommendations in this regard are:

(a) Training should be provided to rural development agents responsible for the follow up of the programming and implementation of rural infrastructure and activity projects, together with the technical and administrative services in the sphere of influence;

(b) Action should be initiated to promote women's domestic activities, particularly those relating to :

(i) Fuel and water conservation in the home;

(ii) Household hygiene particularly for children;

(iii) Balanced diet;

(iv) Birth spacing;

(v) Possibility of producing goods and services at home;

(c) The local cultural heritage should be preserved, managed and strengthened through registration of the various cultural groups, conservation of drama pieces, organization of cultural shows locally, support to the production and marketing of handicrafts;

(d) An information system specific to rural areas and dealing with housing, population, employment and infrastructural issues should be developed at the national level;

(e) Teaching materials should be prepared and disseminated to organizations working in rural areas and to village communities and groups;

(f) Seminars should be organized on the situation and possibilities of rural establishments within specific geographic regions or areas;

(g) Institutions specializing in rural settlements should be established at national level.

IV. INTRODUCTION OF REGIONAL AND INTERNATIONAL MEASURES

121. Efforts should be made at regional level:

(a) To institute at the level of regional organizations and in collaboration of member States, the Rural Promotion Decade in Africa;

(b) To strengthen and diversify the sources of financing for greater coverage of rural development programmes and projects;

(c) To increase assistance to member States in the form of missions for the identification, evaluation and follow up of rural development programmes and projects;

(d) To establish an information system specifically for the rural areas in collaboration with member States.

(a) Strengthen the financing capacity for rural development programmes;

(b) Disseminate findings of research on rural technological development to the States.

V. CONCLUSION

123. The current situation of rural settlements in Africa and the economic trends identified are certainly forcing the pace of rural transformation both in terms of time and space.

124. The impact of the measures and actions proposed in regard to macro-economic integration and the immediate effects on local living conditions will depend on the level of investments that each State will be able to make and the issues and priorities that Governments will set out in their respective development plans.

125. It is in this connection that the issue of rural development, that has today been made one of the priorities in the effort for authentic and lasting development, requires greater human and financial investment, particularly as this decade draws to an end.

126. The assessment of the issues at stake and the challenges posed by the current situation has amply shown that only by so doing can Africa restore its self-confidence and strengthen its identity.

127. The various actions and measures for achieving accelerated qualitative and quantitative rural transformation can serve as a strategy for integrated rural development, to the extent that they are adapted to the technical and economic conditions of each State.

128. They also go to show how much the international community should invest to make Africa in the past trampled upon flourish again.

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